

United Space Alliance, LLC (USA)

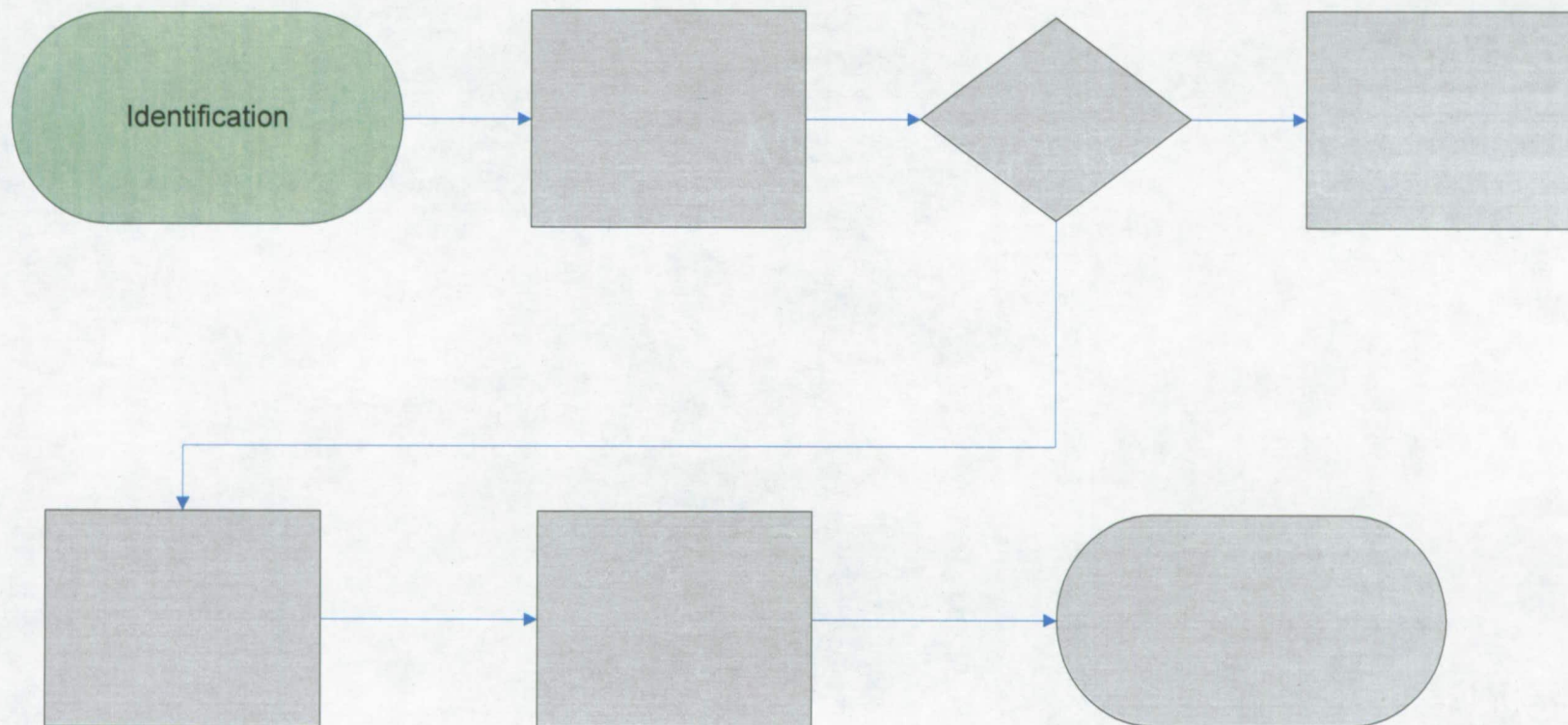
Presents:

**Ground Operations
Process Escapes**

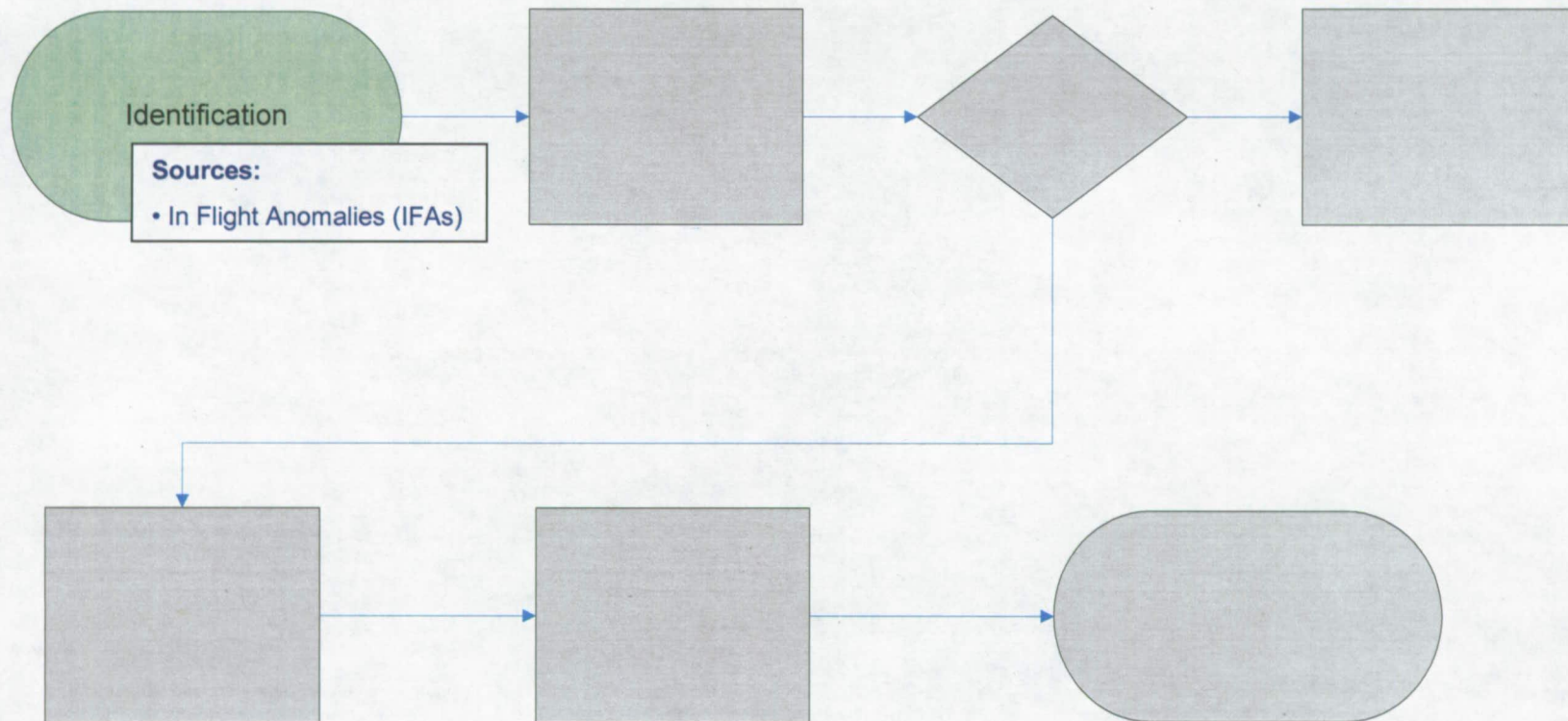
2/6/2008
Prepared by USA GO Process
Assurance Engineering

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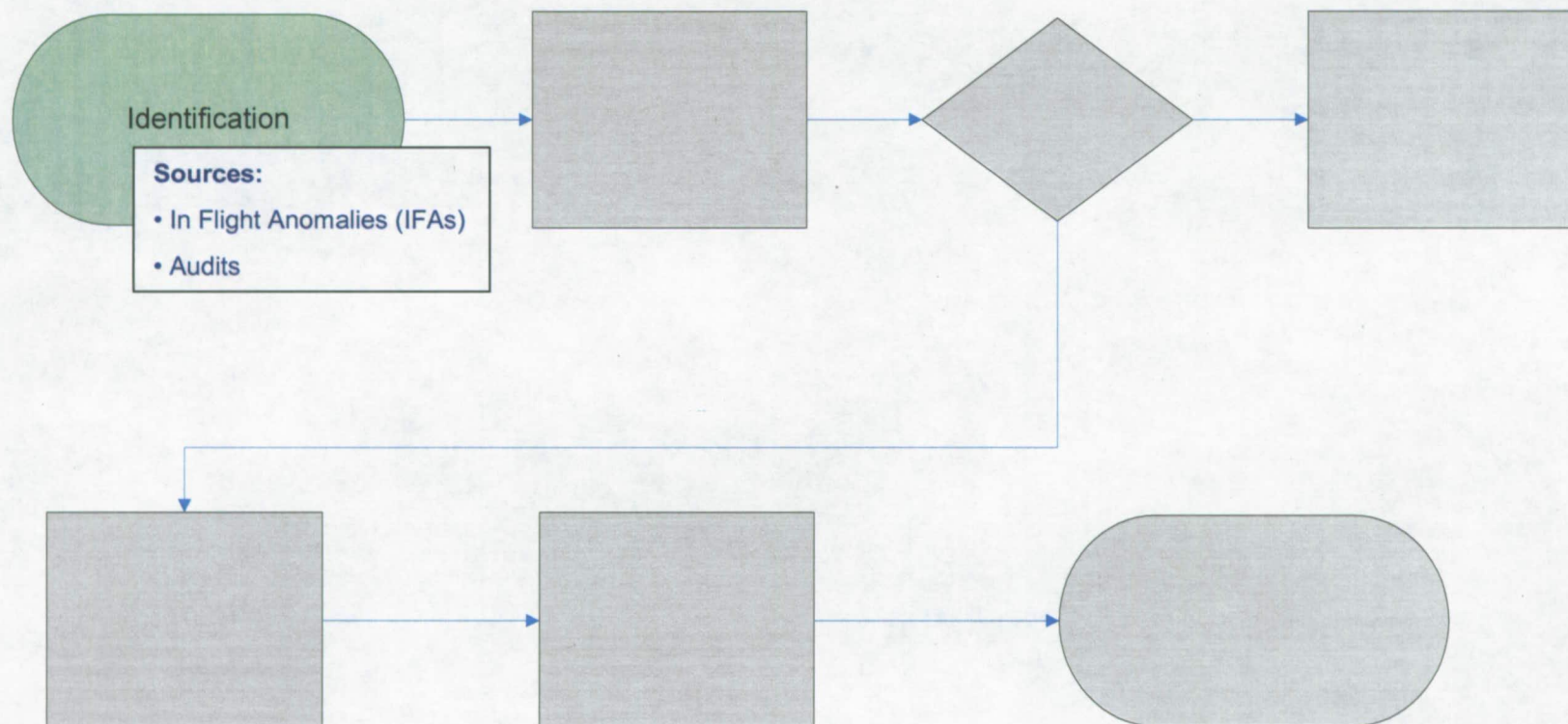
GO Process Escapes: Identification Phase



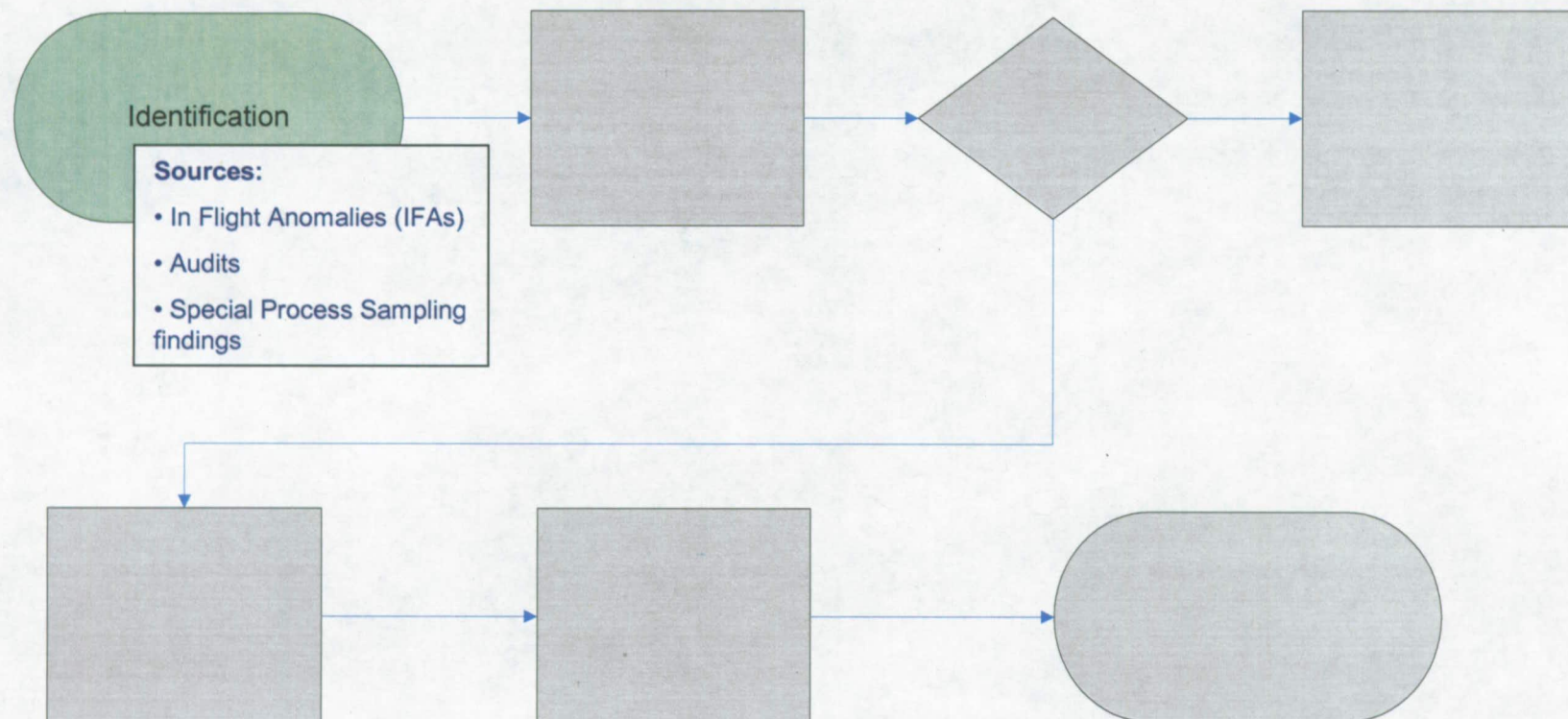
GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



Process Sampling Data Entry

Date: 11/28/2007, 13:34
Status: Complete

Observation Type: In Process Work
Employee: Walker, Steve M

Not Performed

Return

Peer Review is Complete

In-Process Work	
GWA: OPF-1	SWA: GSE
WAD Type: Max WA	System: ONE
WAD: 002173	Pages Reviewed: 0.1
Comments:	
Update	

Add Error Information:

Problem Description Quantity Incorrect

Get Req's Violated

The quantity of nonconforming parts is identified but is wrong.

Remarks:

Resp Organization:

QC
QE
Safety
TCO
Technician
Unknown

Save Error

Current Error Details List	
Error Description	Resp Organization (*)
Schedule - Has Conflict Error Remarks: Proofload crew were scheduled to support work, and attended a briefing instead. Requirements Violated: USA004739-S.5.a & b	Flow Manager

Main Menu

PROCESS SAMPLING
REPORTING SYSTEM

USA HOME | MAIN MENU

Current User: Loporto, Ryan J Permission Level: Developer

Detailed Sample Review Information

Date: 03/07/2007
Status: Complete

Observation Type: In Process Work
Employee: Walker, Steve M

In-Process Work		
GWA: OPF-3	SWA: TPS MID	
WAD Type: DR	System: TPS	
WAD: MID-3-34-5434 *P857841		
Current Error Details List		
Error Description	Resp Organization	Key
Inspection Q Buy Bypassed Error Remarks: Step 10-1 was bypassed and work was done after the designated inspection point. Requirements Violated: USA004644-S.3	Technician	2617
Step/Operation - Worked Out-of-Sequence Error Remarks: Step 10-4 has been worked before Step 10-1 and Item 1.0 and there is not a NOTE or annotation to work out of sequence. Technicians were informed. Requirements Violated: USA004643-Appendix A	Technician	3062

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Main Menu

Curator: Ryan J. Loporto RDM: Peter J. Hopman

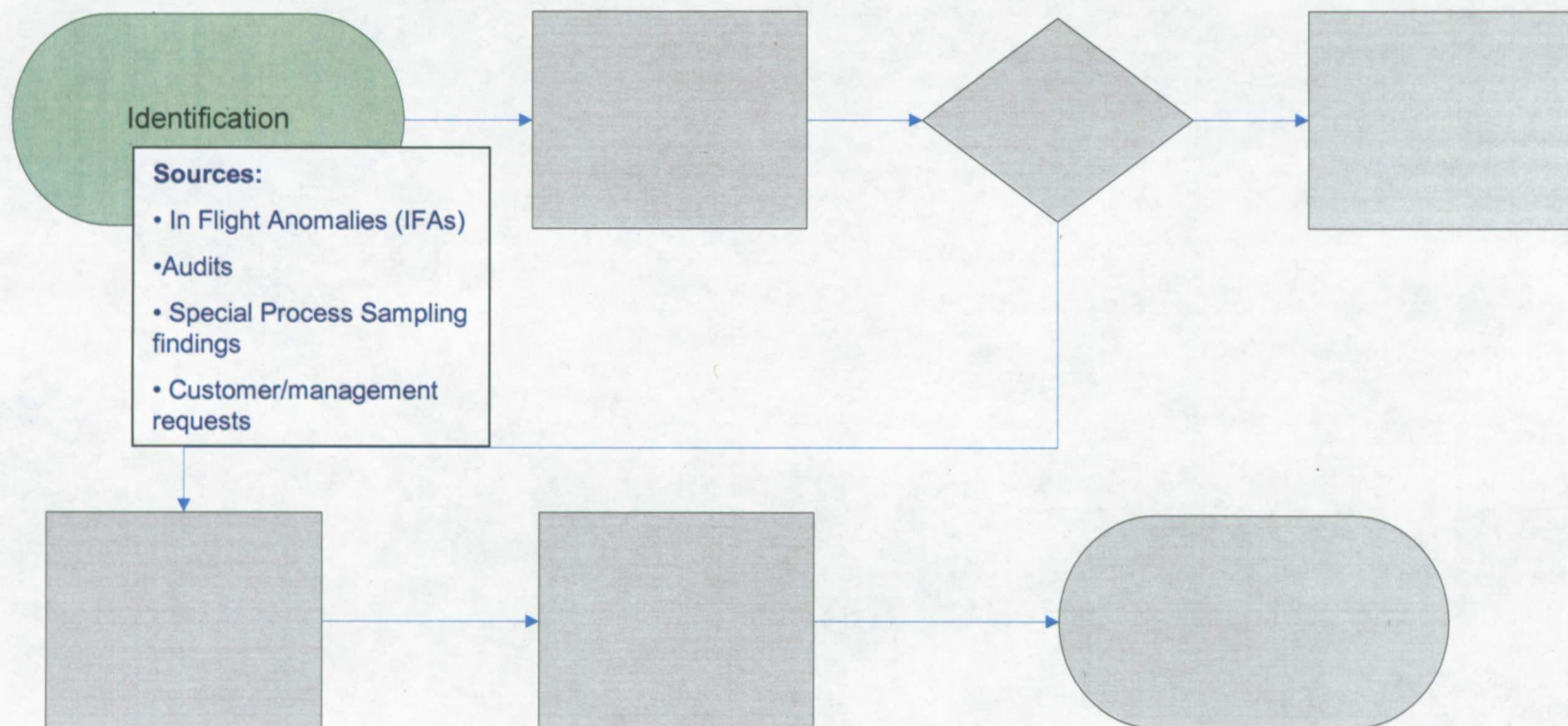
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[\[search.ReviewDetails\]](#)

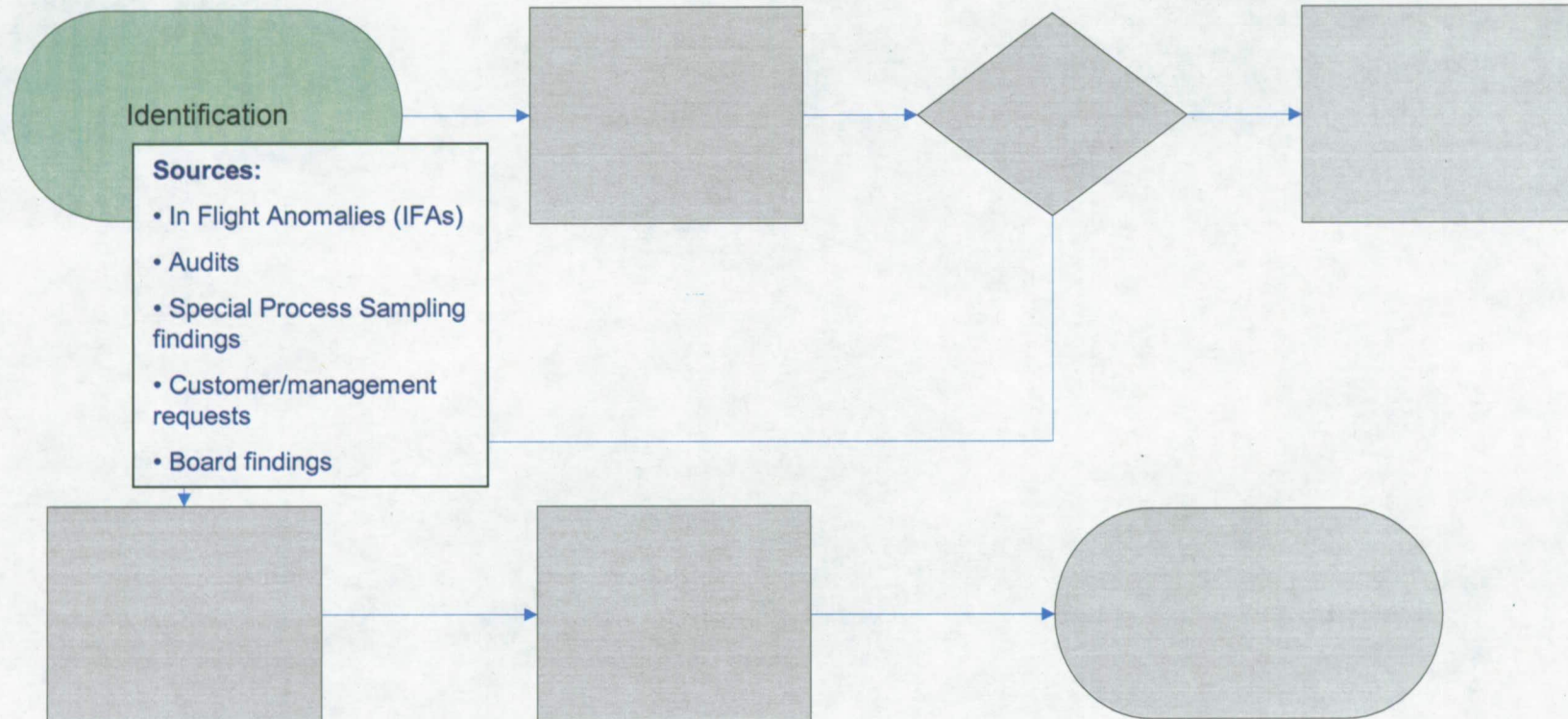
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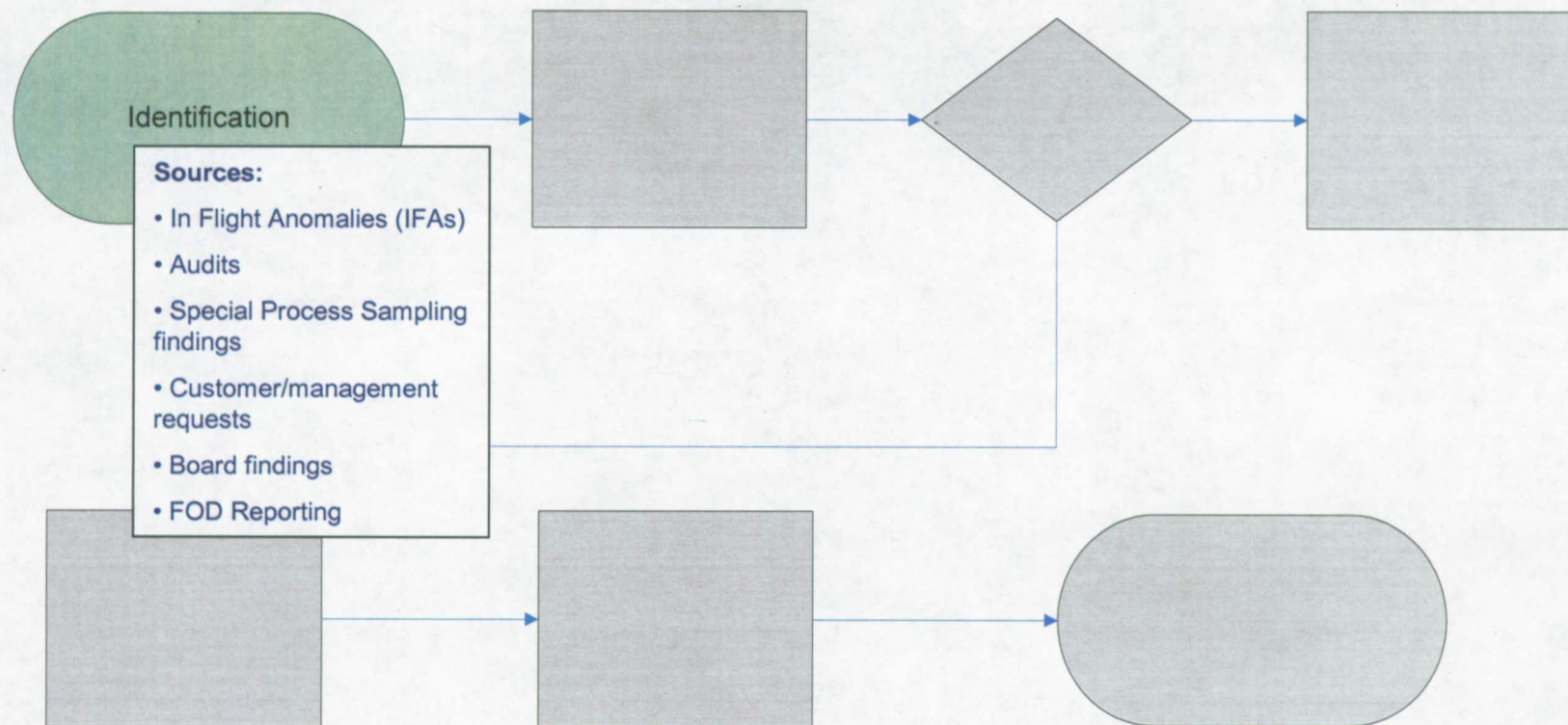
GO Process Escapes: Identification Phase



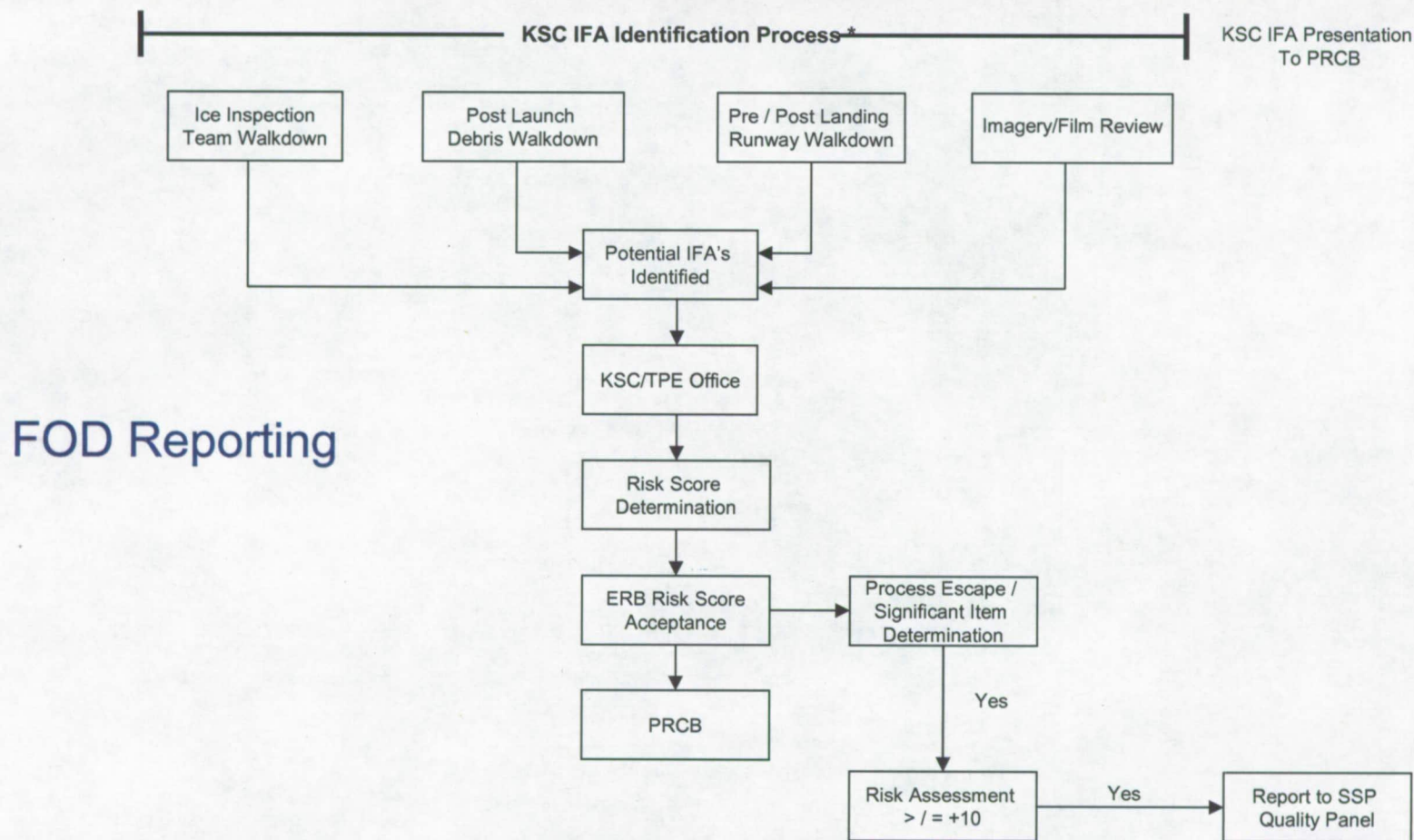
GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



- Reference KSC Operating Procedure USA011494 , Basic-1, 12/19/2007

2/6/2008

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GO Process Escapes: Identification Phase



ISA HOME | MAIN MENU | IQSD Current User: James, Kirsten A

USA FOD CONTROL DATABASE

FOD Input - Get FOD Attribute Details

Site:

Area:

Shift:

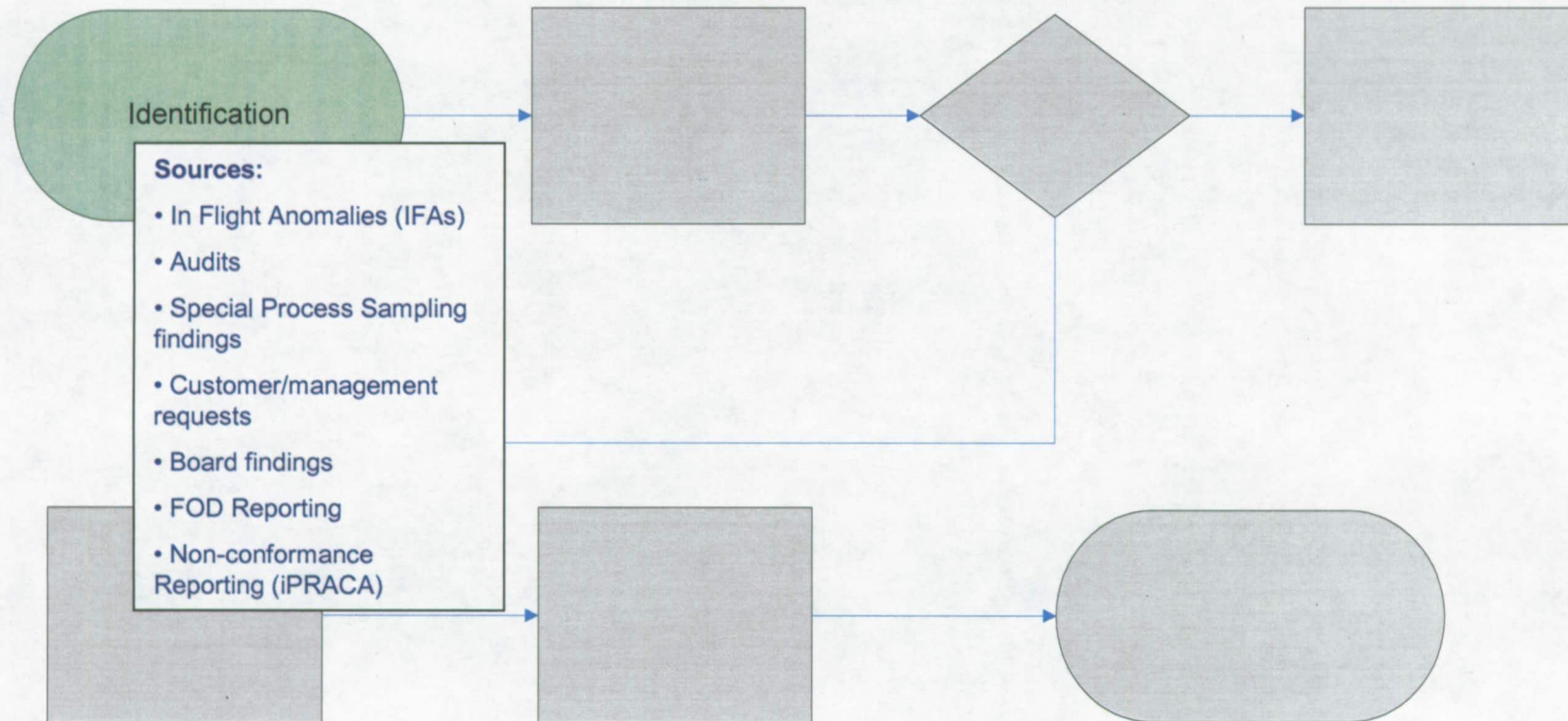
FOD Walkdown Performed By:

Date Entered:

FOD Database

Current FOD Attribute List OPF-3 Midbody							
Zone	FOD Monitor Result	FLM Result	Site Manager Result	NASA Result	Oversite Result	FOD Found	Other (select one)
Elevon Catwalk L/R	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Left main landing gear (left glove/wing if open)	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Mid Shop	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Mid-fuselage, aft (Xo1191 to Xo1307)	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Mid-fuselage, center (Xo807 to Xo1191)	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Mid-fuselage, forward (Xo582 to Xo807)	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Platform 13 L/R	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Platform 6 L/R	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Platform 7 L/R	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Right main landing gear (right glove/wing if open)	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible
Transfer Aisle	No FOD Found	No FOD Found				Red Yellow Blue	No FOD Found, Hardware Not Present, Closed Out or Inaccessible

GO Process Escapes: Identification Phase



GO Process Escapes: Identification Phase



Organization:
 Role:
 Group:
 Individual: Include Unassigned?
 Document Type:
 Keyword / Phrase:



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[Initiation \(0\)](#) [Disposition \(0\)](#) [Approvals \(0\)](#) [Closure \(0\)](#) **[Assessments \(133\)](#)** [Advance Search \(0\)](#)

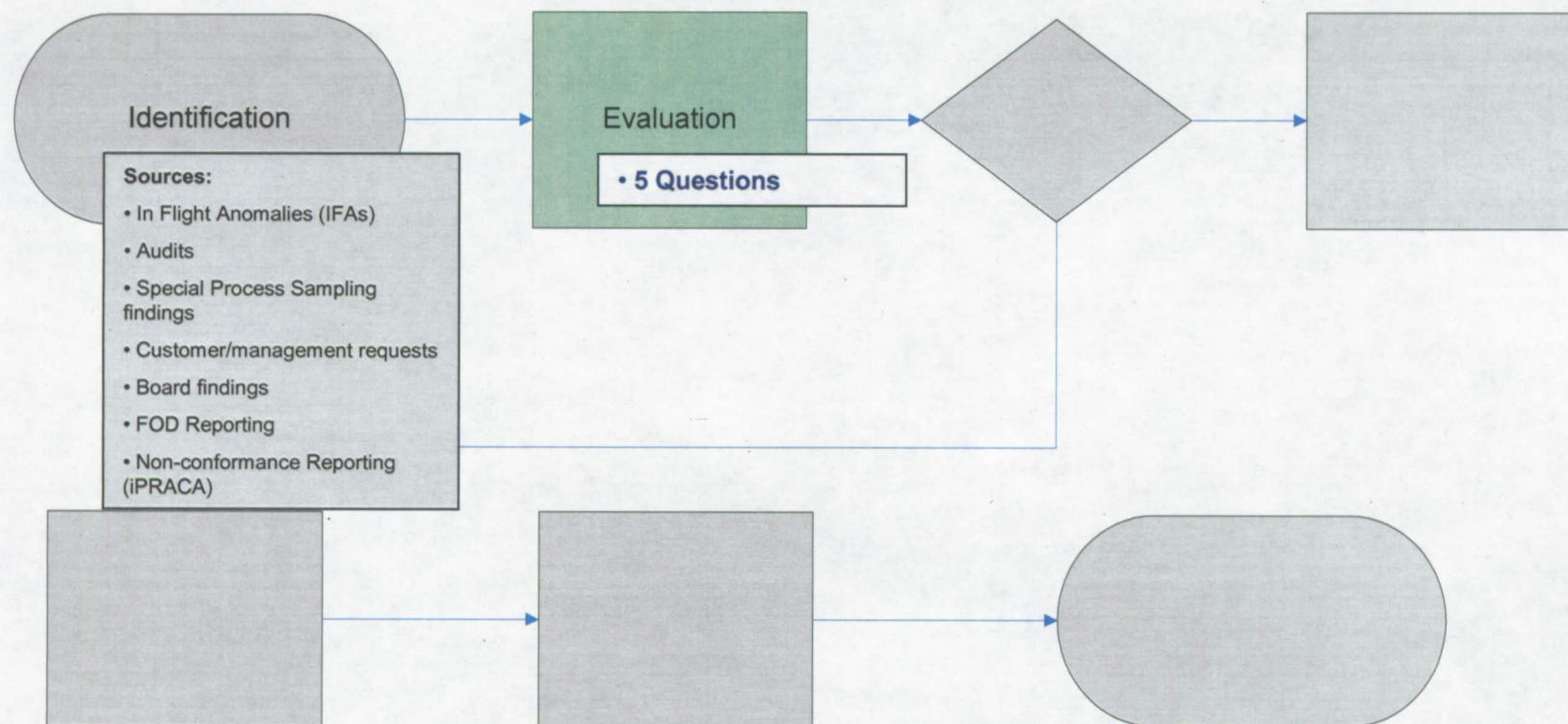
Max Items: Sort By:

Assessments

Select	Task Number	View	Priority	Task Title	Assigned to Group	Workflow Start Date	Task WCH	Workflow State
☐	NC012033-A02-002		-	Corrective Action Assessment	CAE	2008/02/06 11:04 AM	-	CA Assessment Requeste
☐	NC012033-A02-003		-	Process Escape Assessment	CAE	2008/02/06 11:04 AM	-	PE Assessment Requeste
☐	NC015450-A02-001		-	Process Escape Assessment	CAE	2007/11/17 10:56 PM	-	PE Assessment Requeste
☐	NC018205-A02-002		-	Corrective Action Assessment	CAE	2008/02/07 02:26 AM	-	CA Assessment Requeste
☐	NC018205-A02-003		-	Process Escape Assessment	CAE	2008/02/07 02:26 AM	-	PE Assessment Requeste
☐	NC018436-A02-001		-	Process Escape Assessment	CAE	2007/11/17 11:01 PM	-	PE Assessment Requeste
☐	NC018857-A02-001		-	Corrective Action Assessment	CAE	2007/12/18 01:23 PM	-	CA Assessment Requeste
☐	NC018857-A02-002		-	Process Escape Assessment	CAE	2007/12/18 01:23 PM	-	PE Assessment Requeste
☐	NC019484-A02-001		-	Process Escape Assessment	CAE	2007/11/17 11:03 PM	-	PE Assessment Requeste
☐	NC019485-A02-001		-	Process Escape Assessment	CAE	2007/11/17 11:03 PM	-	PE Assessment Requeste

row(s) 1 - 10 of 133 [Next](#)

GO Process Escapes: Evaluation Phase



GO Process Escapes: Evaluation Phase



Integrated Quality Support Database

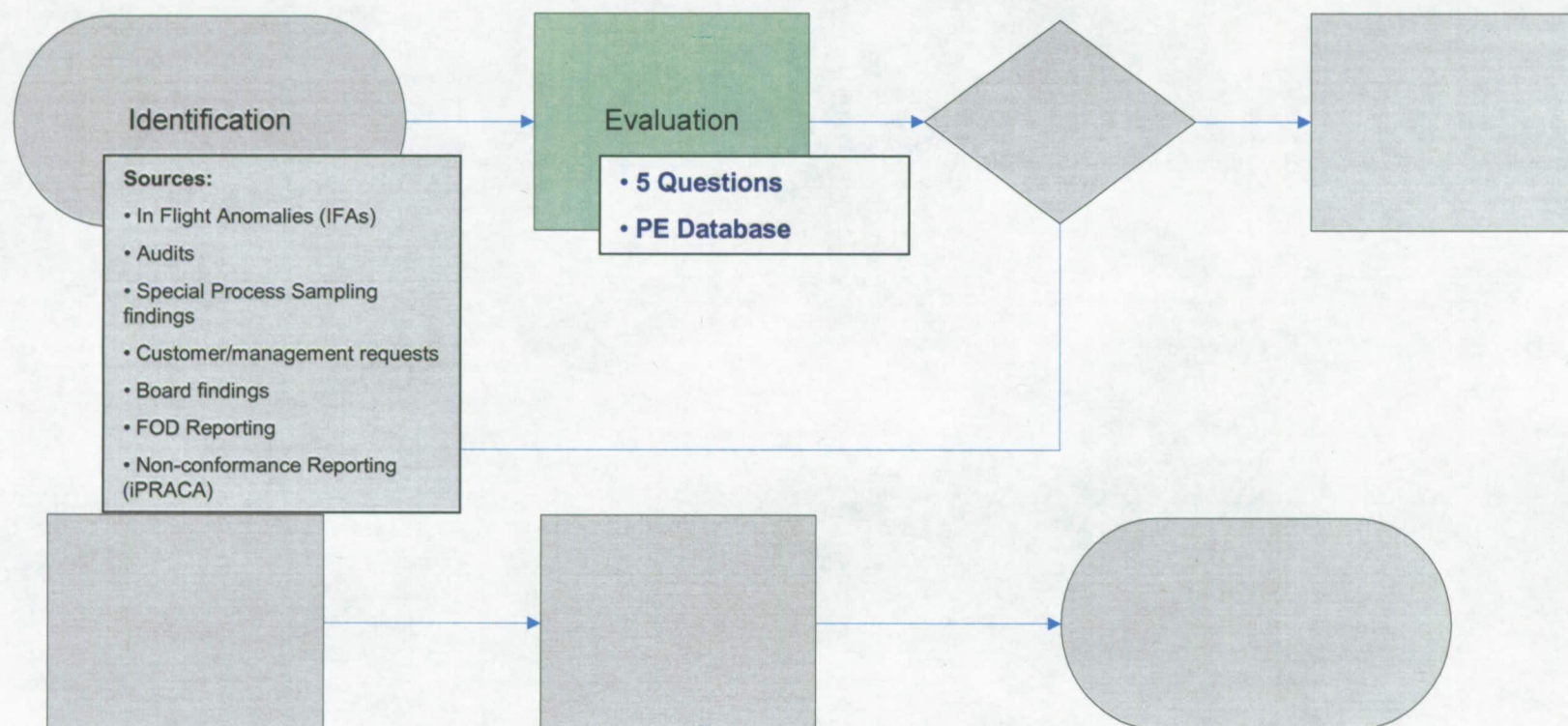
IQSD Home

User: James Kirsten A Department: 0315222

View Process Escape Detail

PV Number:	PV-6-452928	Date:	07/05/2007
EICN:	TCS-4-29-2503		
Detected During:	V63-50018		
Work Area:	OPF-1	Cause Code:	3
Description:	CONFORMAL COAT APPLIED WITHOUT PRIMER ON (10 EA) BLANKET GROUNDS.		
Remarks:			
POC:	Orbiter Operations	POC Evaluation:	This is a Process Escape
Question 1:	Was the vehicle flown (for flight PRs) or was system previously operated (for non-flight PRs) with the noted nonconformance? Yes		
Question 2:	Was the nonconformance detected during the performance of a specific Work Authorization Document (WAD)? Yes V63-50018 post closure engineering review		
Question 3:	Was the work area where the nonconformance was detected closed out for flight (for flight PRs) or approved / ready for use (for non flight PRs)? Yes		
Question 4:	Was the nonconformance detected during surveillance <u>after</u> closeout inspections or final testing? Yes		
Question 5:	In the judgement of the observer, would this nonconformance have been found during final closeout inspections or final testing? The problem should have been detected during installation.		
POC Remarks:			
CAE:	Baldwin, Brian S	CAE Evaluation:	This is a Process Escape
Question 1:	Was the vehicle flown (for flight PRs) or was system previously operated (for non-flight PRs) with the noted nonconformance? Yes		
Question 2:	Was the nonconformance detected during the performance of a specific Work Authorization Document (WAD)? Yes		
Question 3:	Was the work area where the nonconformance was detected closed out for flight (for flight PRs) or approved / ready for use (for non flight PRs)? Yes		
Question 4:	Was the nonconformance detected during surveillance <u>after</u> closeout inspections or final testing? Yes		
Question 5:	In the judgement of the observer, would this nonconformance have been found during final closeout inspections or final testing? Yes		
CAMS Number:	10289	Category:	Mission Success Risk Score: 2 Safety Score: 1
Responsible Organization:	GO/Orbiter Ops		
CAE Remarks:			
PE Evaluation Completion Date:	07/26/2007		

GO Process Escapes: Evaluation Phase



GO Process Escapes: Evaluation Phase



Integrated Quality Support Database

IQSD Home

User: Peter Hopman Department: 03544

Process Escape Menu

Search Process
Escapes Database

POC

Process Escape
Administration

CAE

POC Maintenance

NASA Process Escape
Administration

Process Escape Database Search Results

Process Escapes CAE Evaluated Between: 10/01/2007 and 12/31/2007
Organization: Design Center (Boeing)

Create Excel Sheet

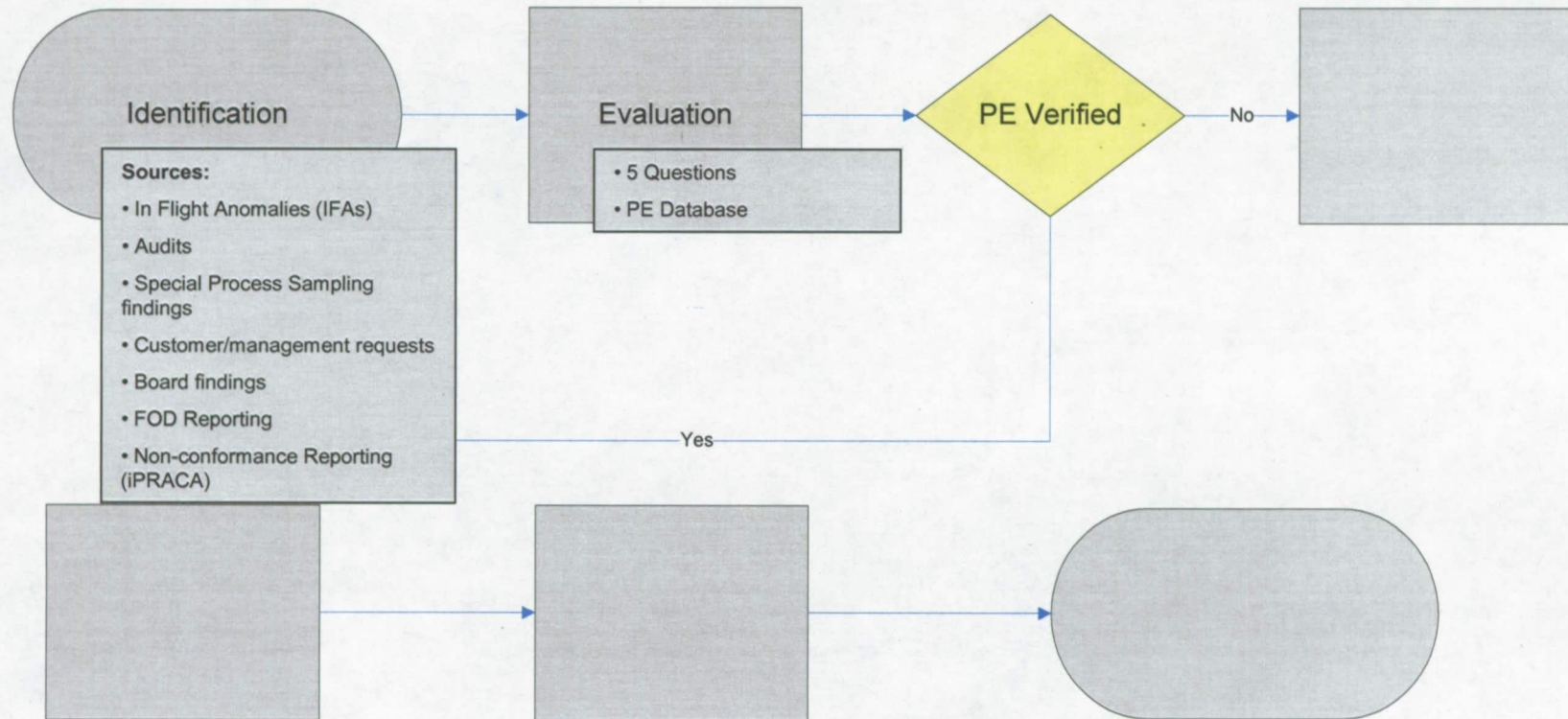
	PV Number	Init Date	CAE Date	EICN	CAE	PE	Risk Score	Responsible Organization	QCats
1	PV-6-454628	08/29/07		MX-5-21-0167	Sheriff David G	Y		Design Center (Boeing)	10371
2	PV-1-011688	09/26/07	01/16/08	H78-3006-00-001-0113	Floyd Charles R	Y	1	GO/GSS	10381
3	PV-6-456083	10/22/07	11/19/07	P70-0857	Floyd Charles R	Y	1	GO/GSS	10385
4	PV-1-011681	09/19/07	10/11/07	A78-5003-03-001-0001	Floyd Charles R	Y	1	GO/GSS	10385
5	PV-1-011682	09/19/07	10/11/07	A78-5003-03-004-0003	Floyd Charles R	Y	1	GO/GSS	10385
6	PV-1-011683	09/19/07	10/11/07	A78-5003-03-006-0002	Floyd Charles R	Y	1	GO/GSS	10385
7	PV-1-011684	09/19/07	10/11/07	A78-5003-03-002-0002	Floyd Charles R	Y	1	GO/Orbiter Ops	10385
8	PV-1-011685	09/19/07	10/11/07	A78-5003-03-003-0003	Floyd Charles R	Y	1	GO/GSS	10385
9	PV-1-011686	09/19/07	10/11/07	A78-5003-03-005-0002	Floyd Charles R	Y	1	GO/GSS	10385
10	PV-1-011687	09/26/07	11/19/07	H78-3006-00-001-0112	Floyd Charles R	Y	1	SRBE	10385
11	PV-6-455533	10/03/07		APU-3-34-0688	Eidem Sean C	Y		Select One	10419
12	PV-6-455534	10/03/07		APU-4-29-0704	Eidem Sean C	Y		Select One	10419
13	PV-6-455536	10/03/07		APU-5-21-0336	Eidem Sean C	Y		Select One	10419
14	PV-6-R153900	09/18/07	10/30/07	AFT-3-A0171	Baldwin Brian S	Y		GO/Orbiter Ops	10438
15	PV-6-456107	10/23/07		U70-1106	Swanger Samuel L	Y		Select One	10455
16	PV-6-455932A	10/30/07	11/28/07	ECL-5-21-1126 Page 1A	Taylor Charles C	Y	1	GO/Orbiter Ops	10467

2/6/2008

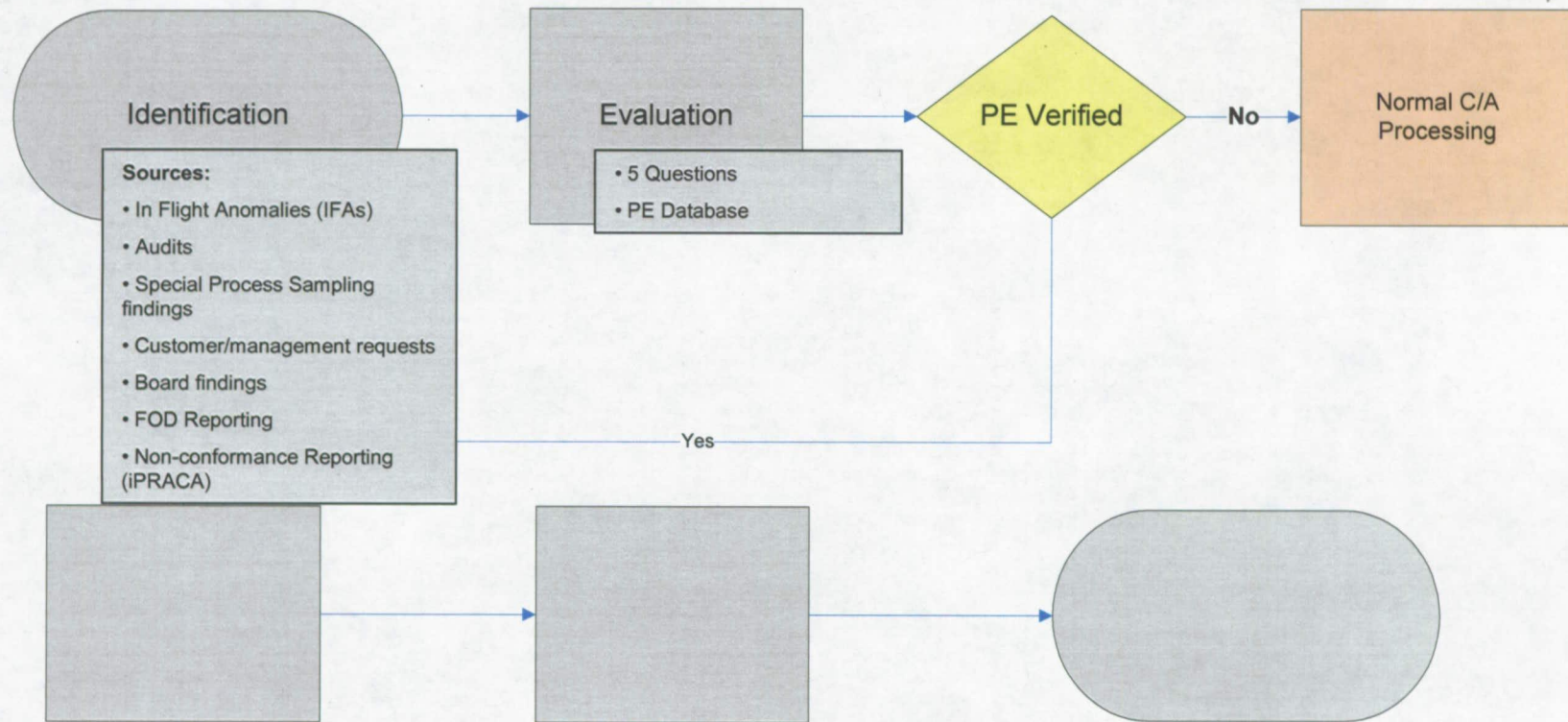
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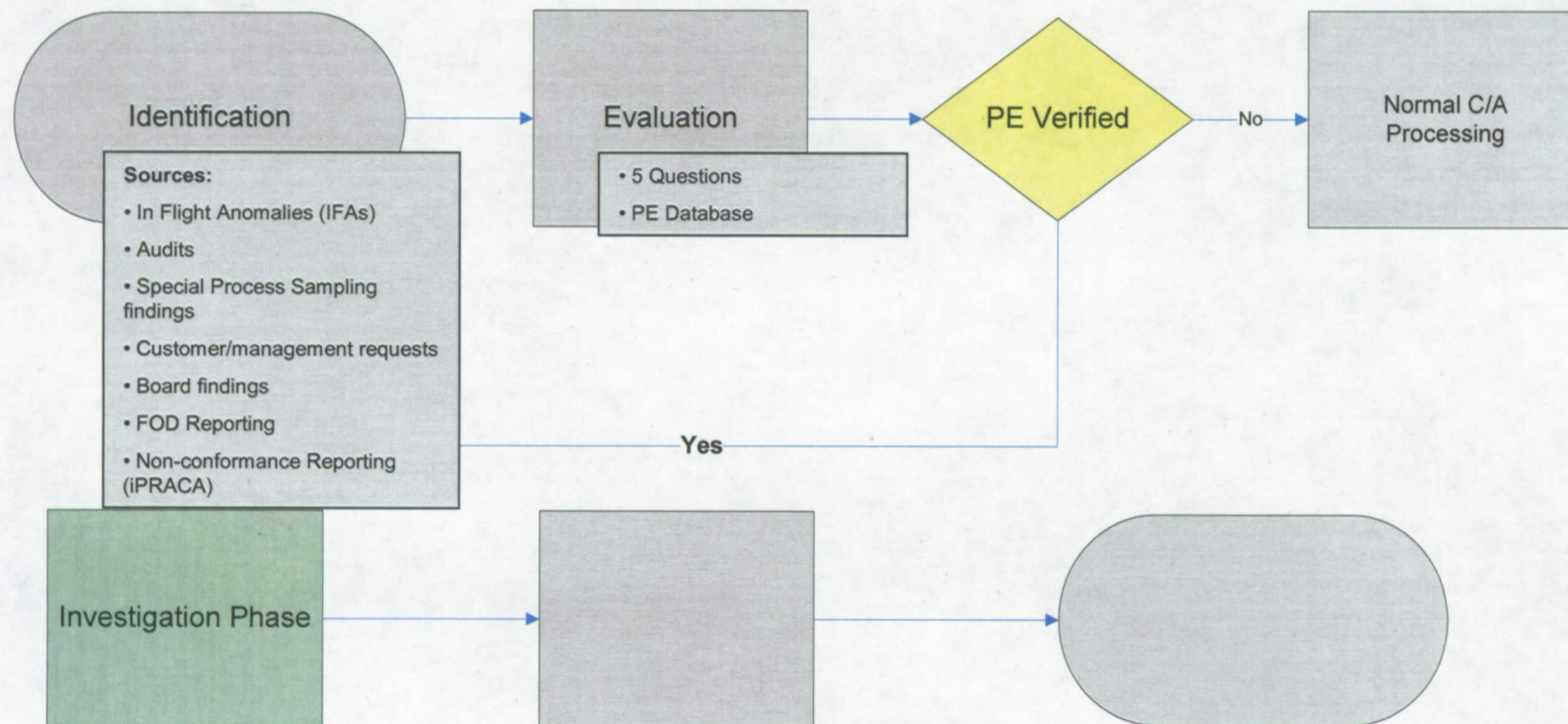
GO Process Escapes: Investigation Phase



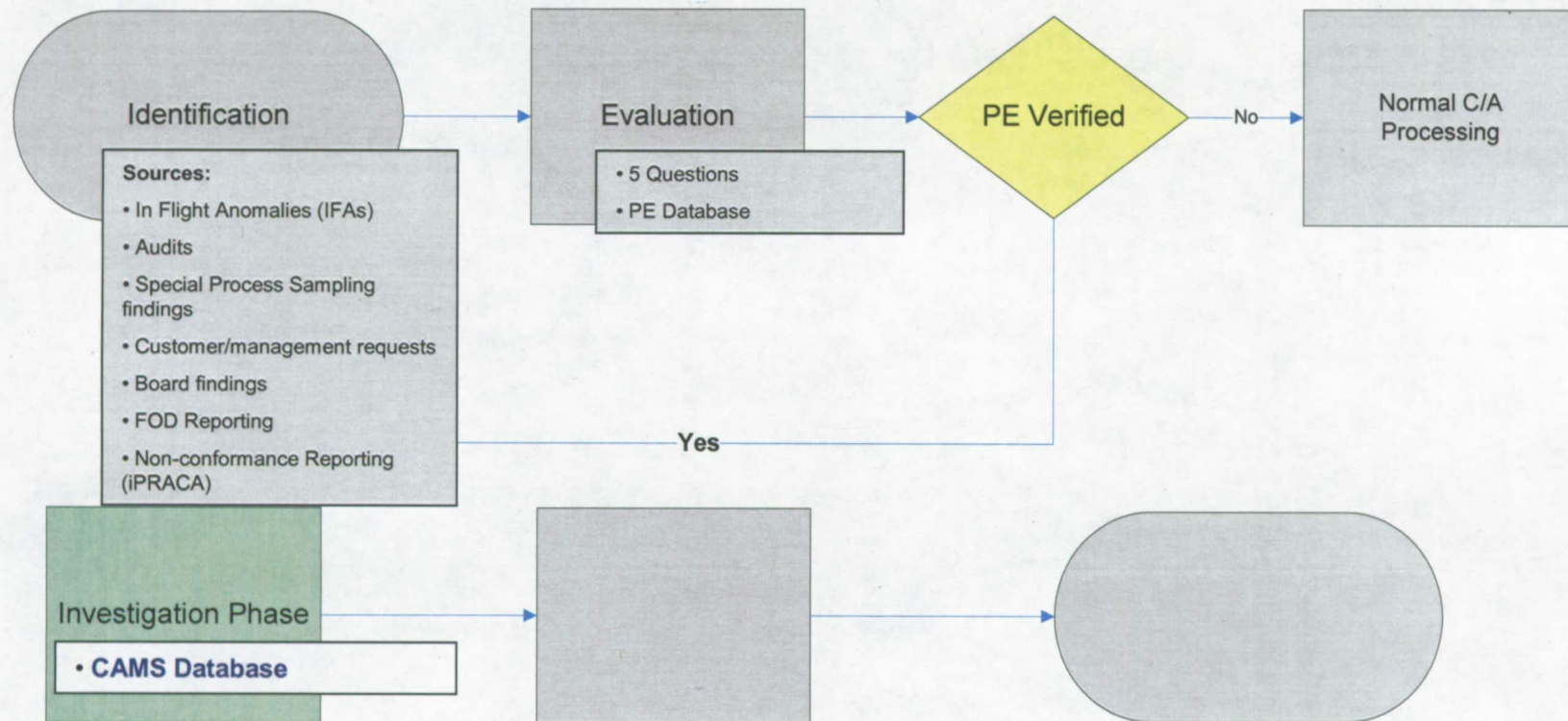
GO Process Escapes: Investigation Phase



GO Process Escapes: Investigation Phase



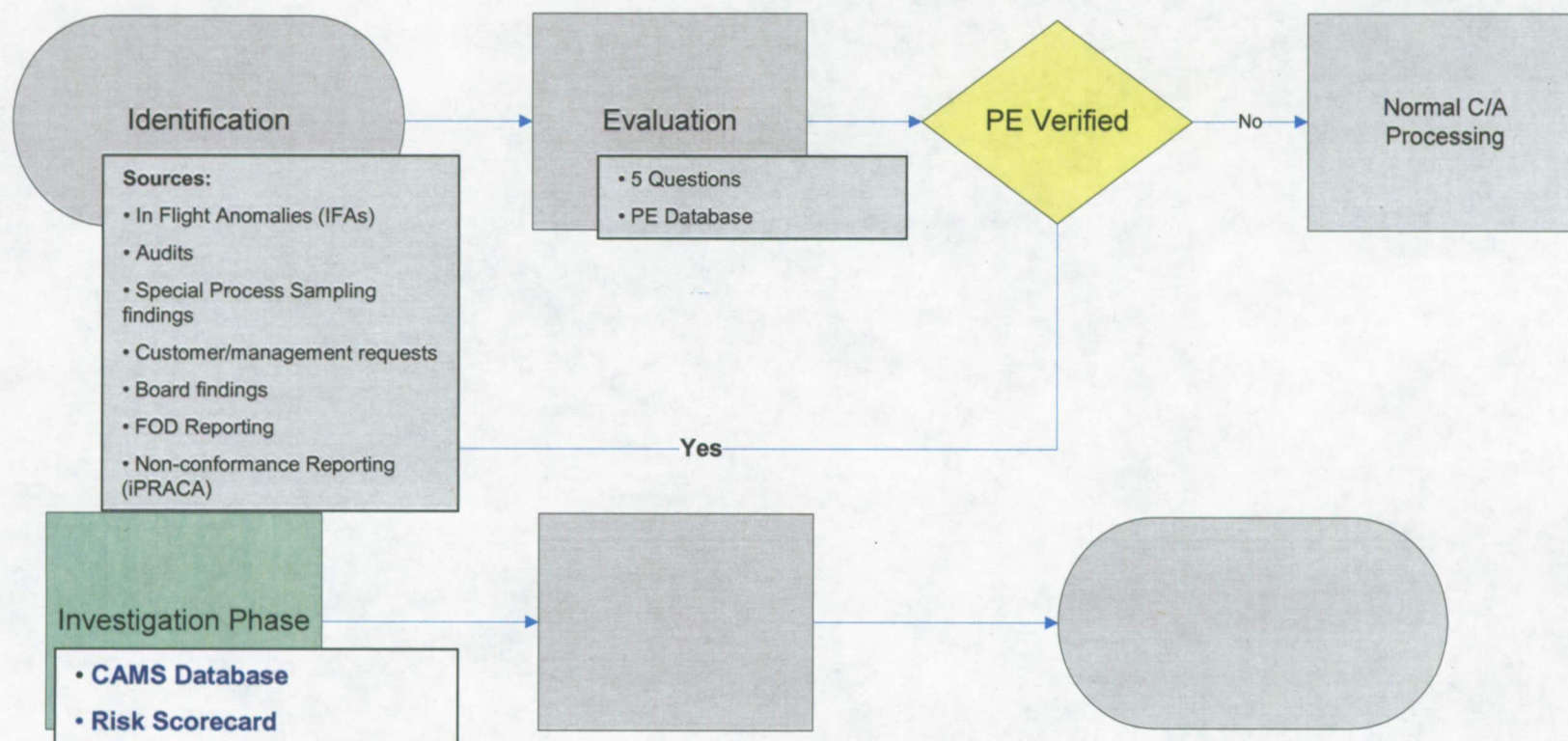
GO Process Escapes: Investigation Phase



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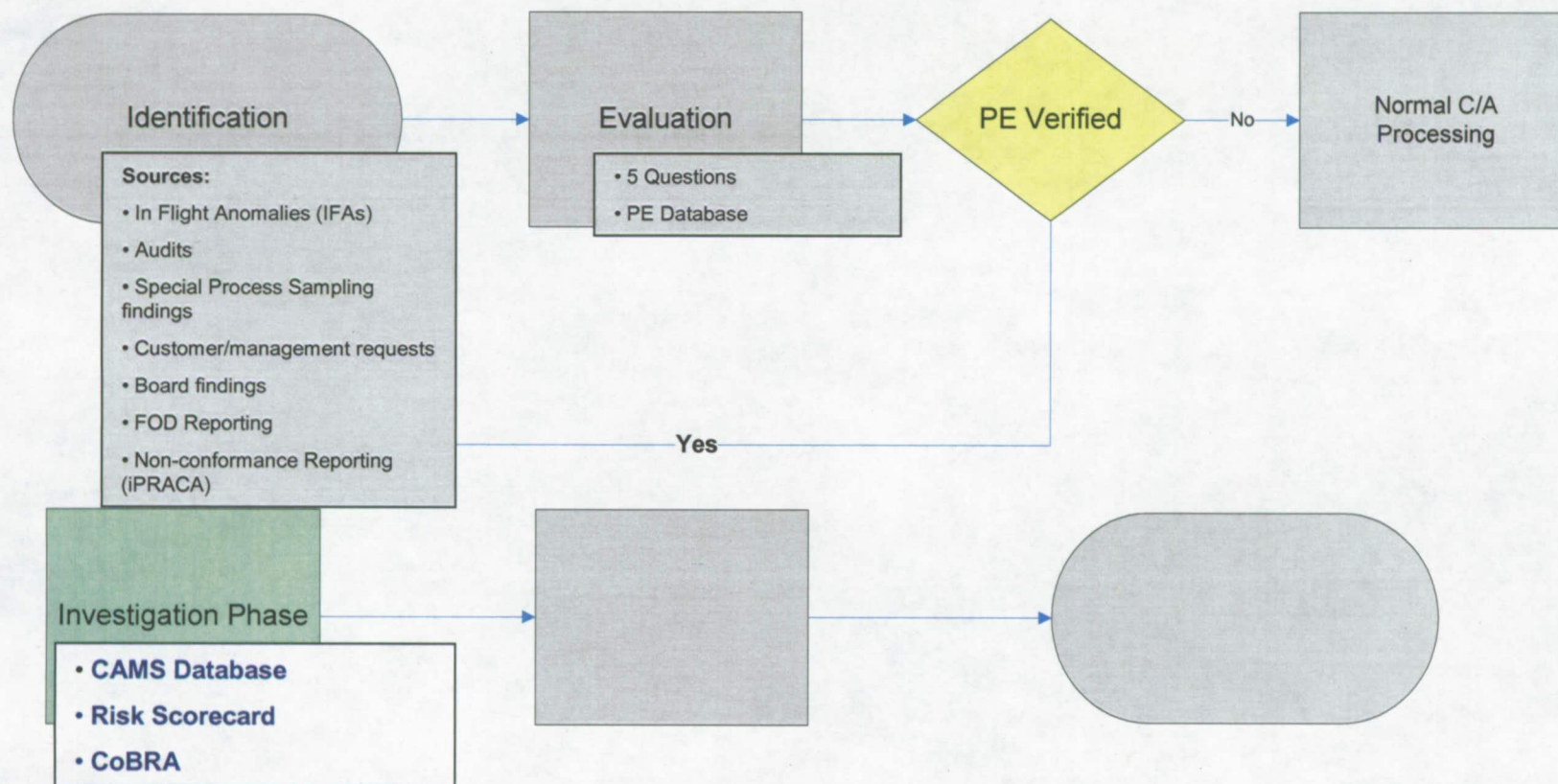


GO Process Escapes: Investigation Phase

- **Risk Score Card**
 - Basis for decision making
 - Accounts for Safety, Mission Success, Support, Schedule and Cost
 - Created universal understanding of Red, Yellow and Green in describing Risk



GO Process Escapes: Investigation Phase



GO Process Escapes: Investigation Phase



CoBRA

Control Based Risk Assessment

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Current User: James, Kirsten A Permission Level: Admin

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[Chain of Events](#)
[Risk Determination](#)
[Likelihood Reduction](#)
[Risk Score](#)

Evaluation Subject: CAM-10200

Event	Likelihood	Consequence					Maximum Risk Score Color
		Safety	Mission Success	Support	Schedule	Cost	
1) 1. Prevent procedure from being written without correct test requirements.	3	1	1	1	1	1	3x1 = 3 Green
2) 2. WAD written without correct test requirements	3	1	1	1	1	1	3x1 = 3 Green
3) 3. WAD worked without correct test requirements	3	1	1	1	1	1	3x1 = 3 Green
4) 4. Hardware installed without correct tests being performed prior to / at installation	3	1	1	1	1	1	3x1 = 3 Green
5) 5. Orbiter rolls from OPF to VAB without correct tests being performed prior to installation	3	1	1	1	1	1	3x1 = 3 Green
6) 6. Orbiter rolls from VAB to PAD without correct tests being performed prior to installation	3	1	1	1	1	1	3x1 = 3 Green
7) 7. Orbiter launch's without correct tests being performed prior to installation	3	3	3	1	1	1	3x3 = 9 Yellow
8) 8. Orbiter lands without correct tests being performed prior to installation	3	3	3	1	1	1	3x3 = 9 Yellow

Add/Edit Comments

The noted electrical harnesses (V070-775247, V070-775338, V070-775937, and V070-775939) installed on OV-104, flew on STS-115 without incident. OEL Subject Matter Expert (SME) indicates the plan for STS-117 is for PR PV-6-451601 / OEL-4-28-5145 to be deferred until after the STS-117 mission.

[Edit Comments](#)
[View Report](#)

GO Process Escapes: Investigation Phase

Four Key Points of the CoBRA Process

CoBRA is a means of performing a Risk Assessment that specifically accomplishes the following:



Bases Risk Likelihood solely on Control strength



Considers a Risk Assessment as a chain of events rather than a single incident



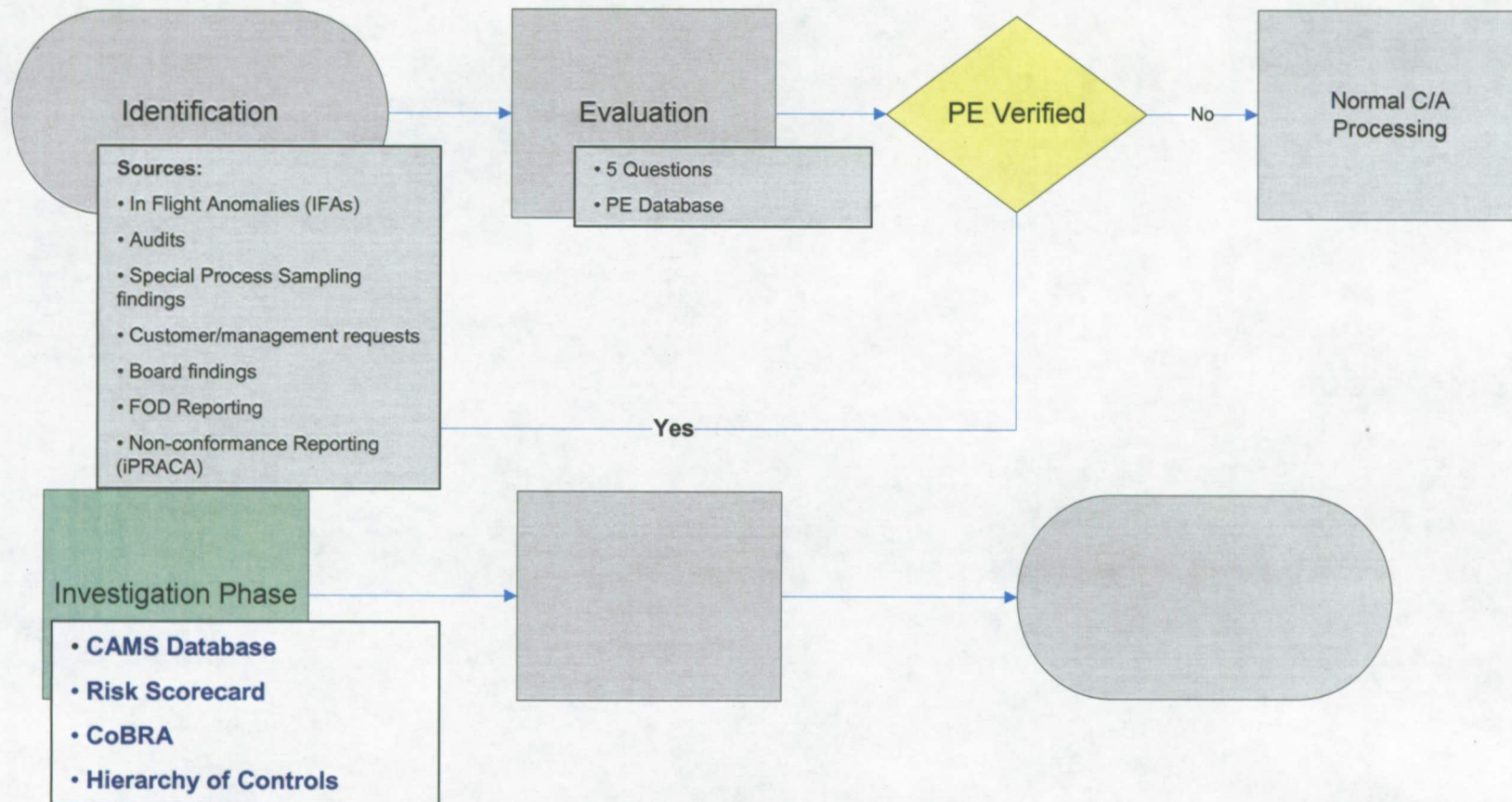
Clearly documents the thought process that a Risk Assessment is based upon



Risk "Acceptance" allowed only by management or specifically designated Risk Review Boards

Provides consistency and repeatability on Risk Assessments!!

GO Process Escapes: Investigation Phase



GO Process Escapes: Investigation Phase



List of Ranked Controls

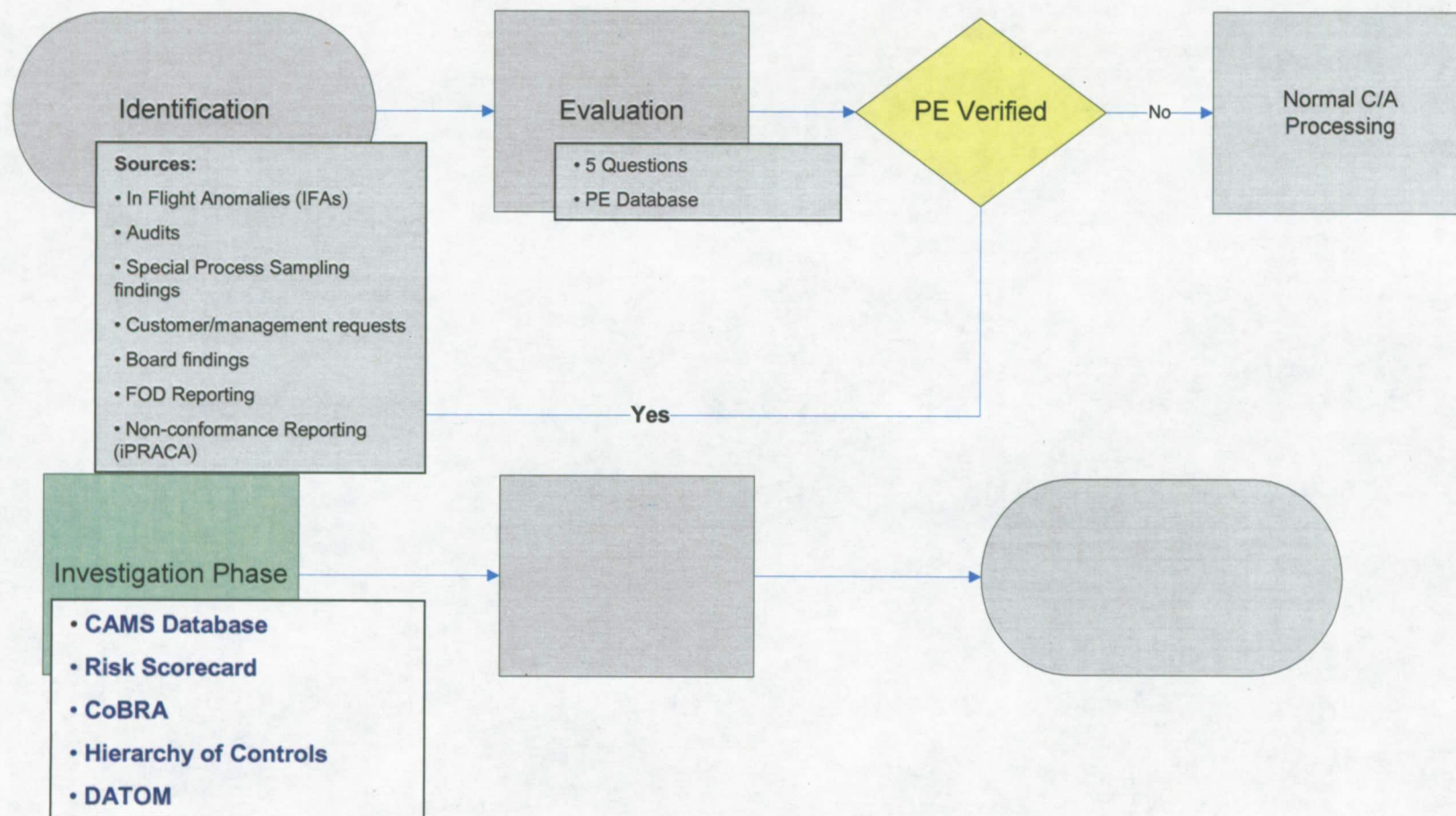
CAE used historical data to see what controls management wanted implemented as Recurrence Control actions based on the various consequences of the incidents being reviewed. The hierarchy list was developed based on controls per consequence data

Control Suitability Scorecard					Acceptable Likelihood Reduction
Controls In Place	Distribution	Retention	Vulnerability	Total	
1. Hardware design is such that the potential problem has no possibility of occurring. Includes properly designed / performed testing.	5	5	5	15	4
2. There are specific OMRS requirements in the WADs that directly prevent the problem.	5	5	4	14	4 or 3
3. WADs contains detailed buy steps and additional expertise (Q.C. Engineering, NDE)	5	4	4	13	4 or 3
4. WADs detailed buy steps include notes, cautions, and warnings of a potential problem	5	5	2	12	3
5. WAD buy steps or site placard provide direction on performing a task	4	5	3	12	3 or 2
6. Hardware / Tooling designed to reduce the likelihood of problem occurring	4	5	3	12	3 or 2
7. Certified Training (with experience) that specifically addresses the potential problem	4	4	4	12	2 or 1
8. The specification addresses the potential problem and provides guidance	4	4	2	10	1
9. Medical, Fire, or other Emergency response activities limit the impact	5	5	0	10	1
10. FPPs / OPs address this potential problem	3	4	3	10	1
11. Local internal procedures (departmental) address potential problem	3	4	3	10	1
12. Directors, CAE, or Safety type bulletins have been previously issued on possibility.	3	3	2	8	1
13. Tailgate meetings have been previously held to address this potential problem	3	2	2	7	1
14. Individuals who have caused similar problems in the past have been counseled	2	2	1	5	0
15. Trust the odds that the problem will not occur.	1	1	1	3	0
Distribution – Will everyone who needs to be informed of the Control, be informed? Retention – How dependent are the Controls upon an individual's memory? Vulnerability – How likely is it that the Control will work as desired in order to prevent the potential problem? RATING OF CONTROLS STRONG 13 - 15 MEDIUM 9 - 12 WEAK 3 - 8					RATING OF CONTROLS Dark Green - When the circumstances warrant implementing whatever controls necessary to assure the problem never occurs, these are the controls that have proven to be the most effective. Medium Green - With these controls, the likelihood of this problem occurring will have been significantly reduced. Other controls are available that have shown to be even more effective. Light Green - These controls provide some positive effect towards preventing the problem, but it can be expected that this very problem or something similar to this problem will likely still occur.

2/6/2008

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GO Process Escapes: Investigation Phase



GO Process Escapes: Investigation Phase



Define

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GO Process Escapes: Investigation Phase



Define

Assign

T

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GO Process Escapes: Investigation Phase



Define

Assign

Train

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M

GO Process Escapes: Investigation Phase



Define

Assign

Train

Organize

M

GO Process Escapes: Investigation Phase



Define

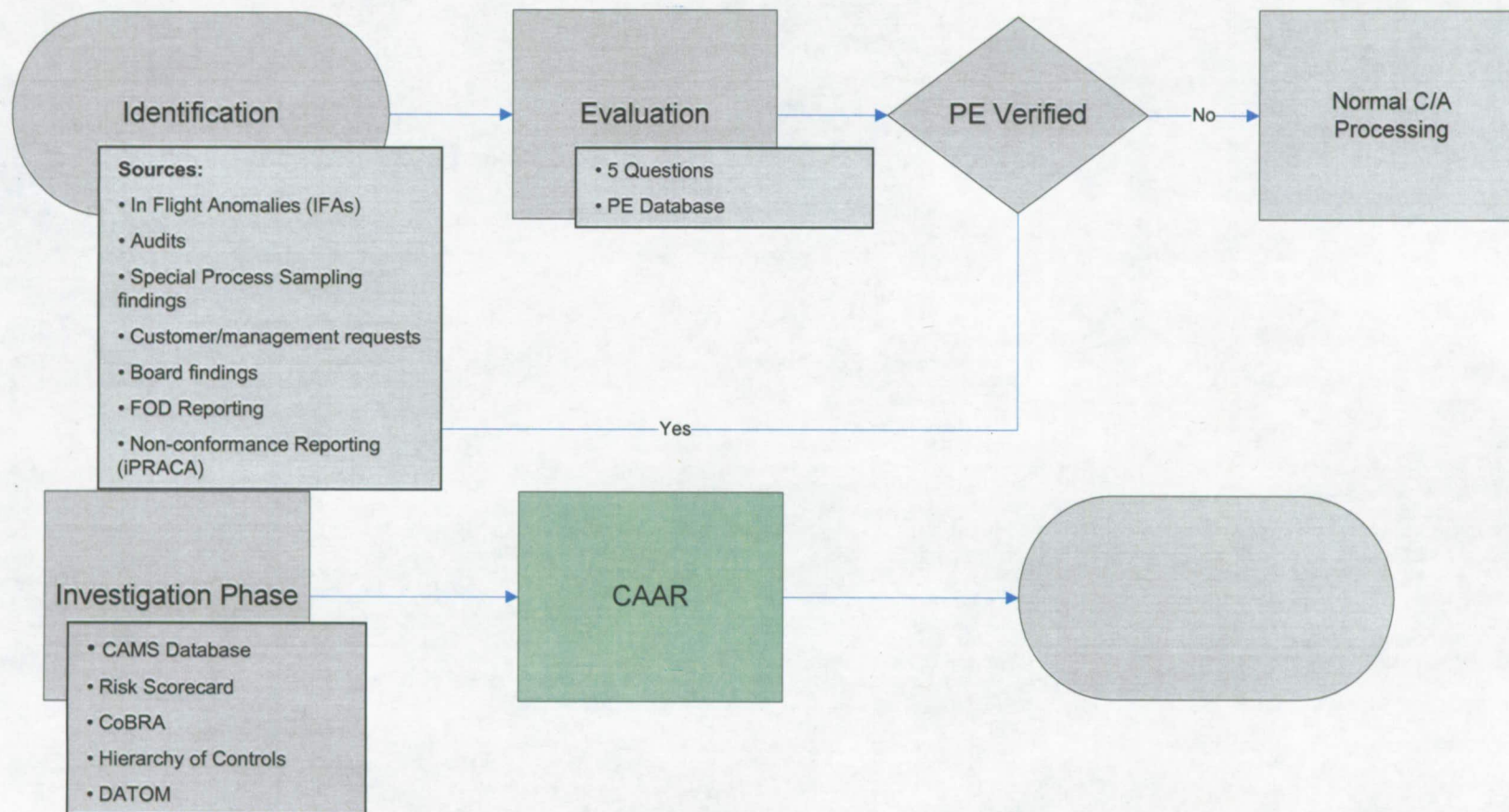
Assign

Train

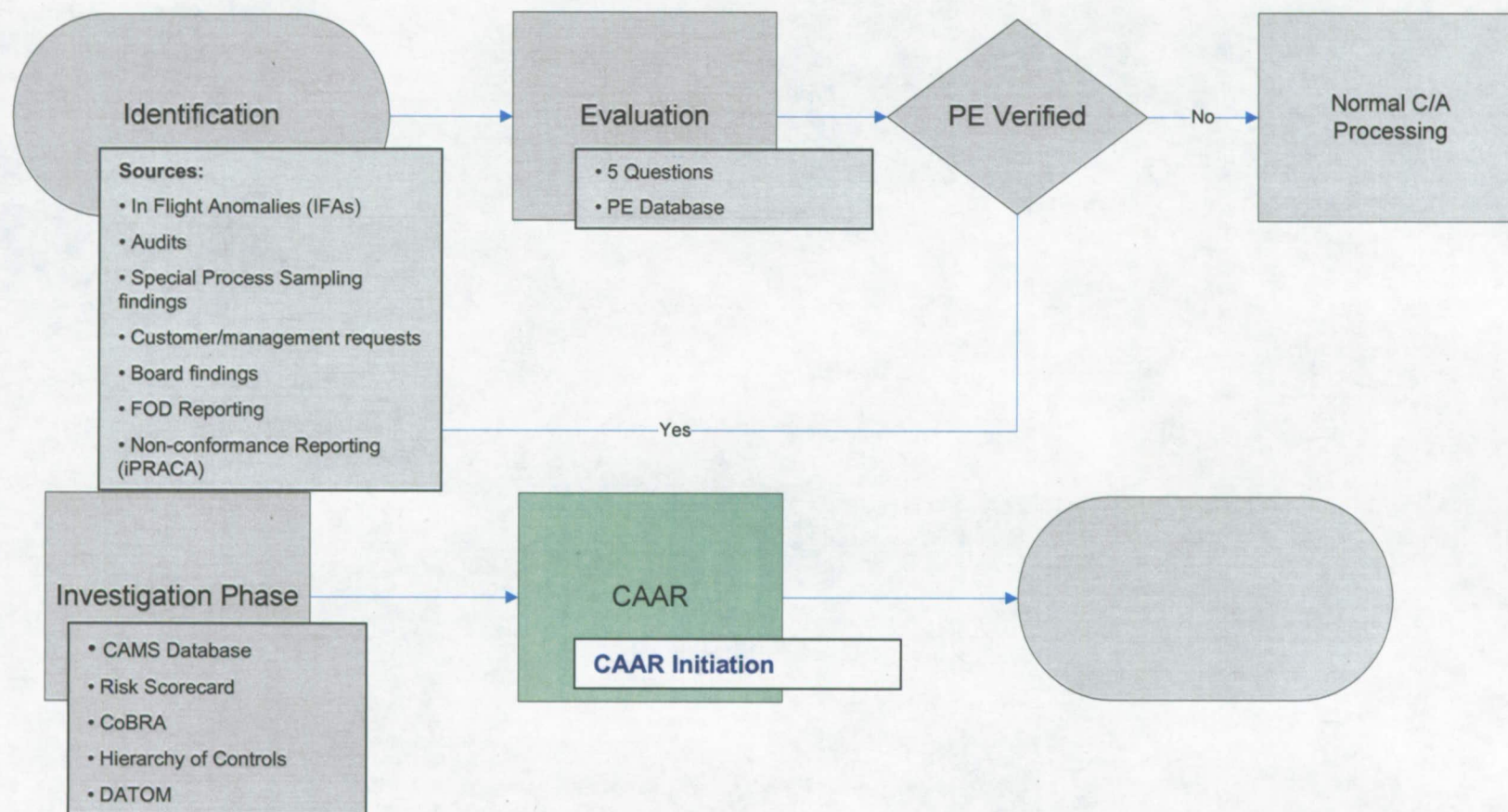
Organize

Monitor

GO Process Escapes: CAAR Phase



GO Process Escapes: CAAR Phase



GO Process Escapes: CAAR Phase

• CAAR initiation

- Identifies responsible organization
- Develops Corrective Action Plan (CAP)
 - Actions planned are directly related to risk assessments
 - Develop/establish ECDs for planned actions



CAMS

CORRECTIVE ACTION MANAGEMENT SYSTEM

[USA HOME](#) | [MAIN MENU](#)
Current User: James, Kirsten A Permission Level: Admin

[Initiate a CAMS Record](#) | [View My CAMS](#) | [Search CAMS Records](#) | [Generate CAMS Report](#)

[Attachments](#)
[CoBRA](#)
[Reasons](#)
[Notes](#)

Initiate CAAR Record

Status:

- ✗ CAM-10455
- ✗ CAM-10455-C1
 - CAM-10455-C1 -V1 [In-Work]

Task Number: CAM-10455-C-2

PRACA No: PV-6-456107

Part No: HE901-671

Part Name: GENERATOR

*Title: Process Escape. NORTH BALL/BAR GENERATOR TRIPPED ON UNDERVOLTAGE. Reference Report Number: PV-6-456107

*Description: NORTH BALL/BAR GENERATOR TRIPPED ON UNDERVOLTAGE.

Type: Corrective Action

Originator: James, Kirsten A ***** 321/661-6576

POC: James, Kirsten A ***** 321/661-6576

Subject Matter Expert: [Add](#)

Comments/Summary:

Cause Description:

Remedial Action:

Corrective Action Plan:

* Indicates a required field. [Check Spelling](#)

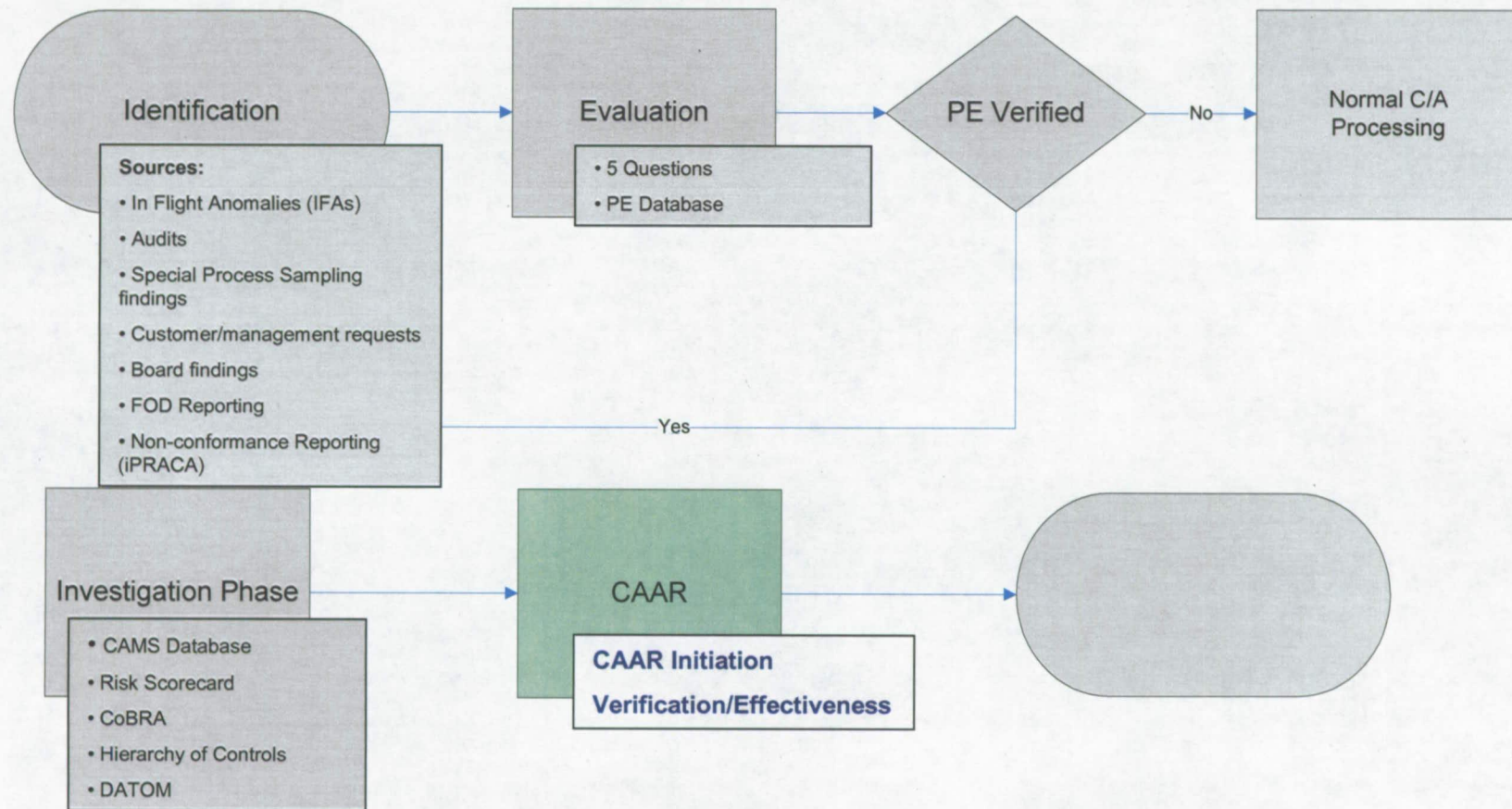
[Save Record](#)

Date Initiated: 02/08/2008

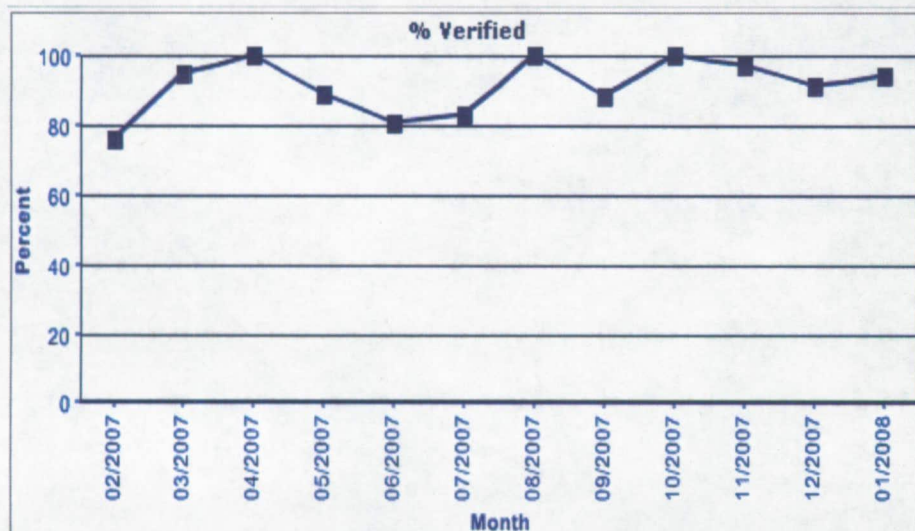
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Element:

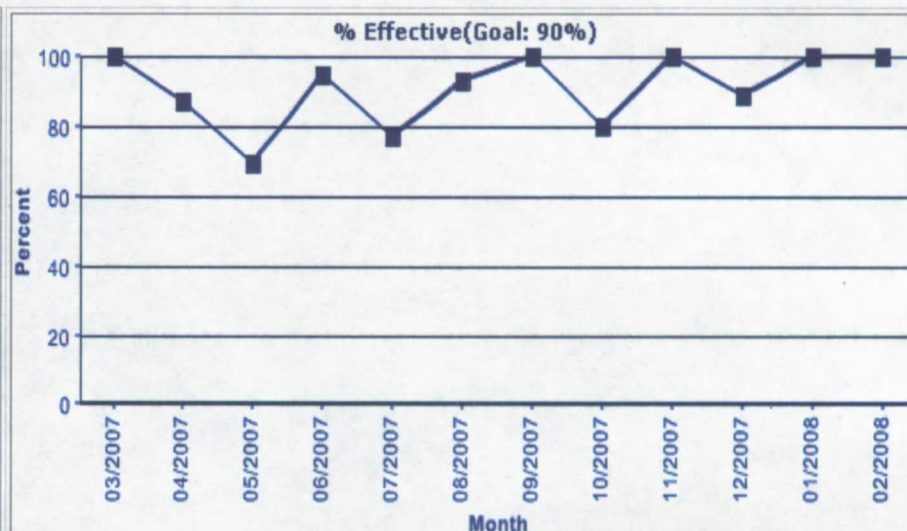
GO Process Escapes: CAAR Phase



GO Process Escapes: CAAR Phase

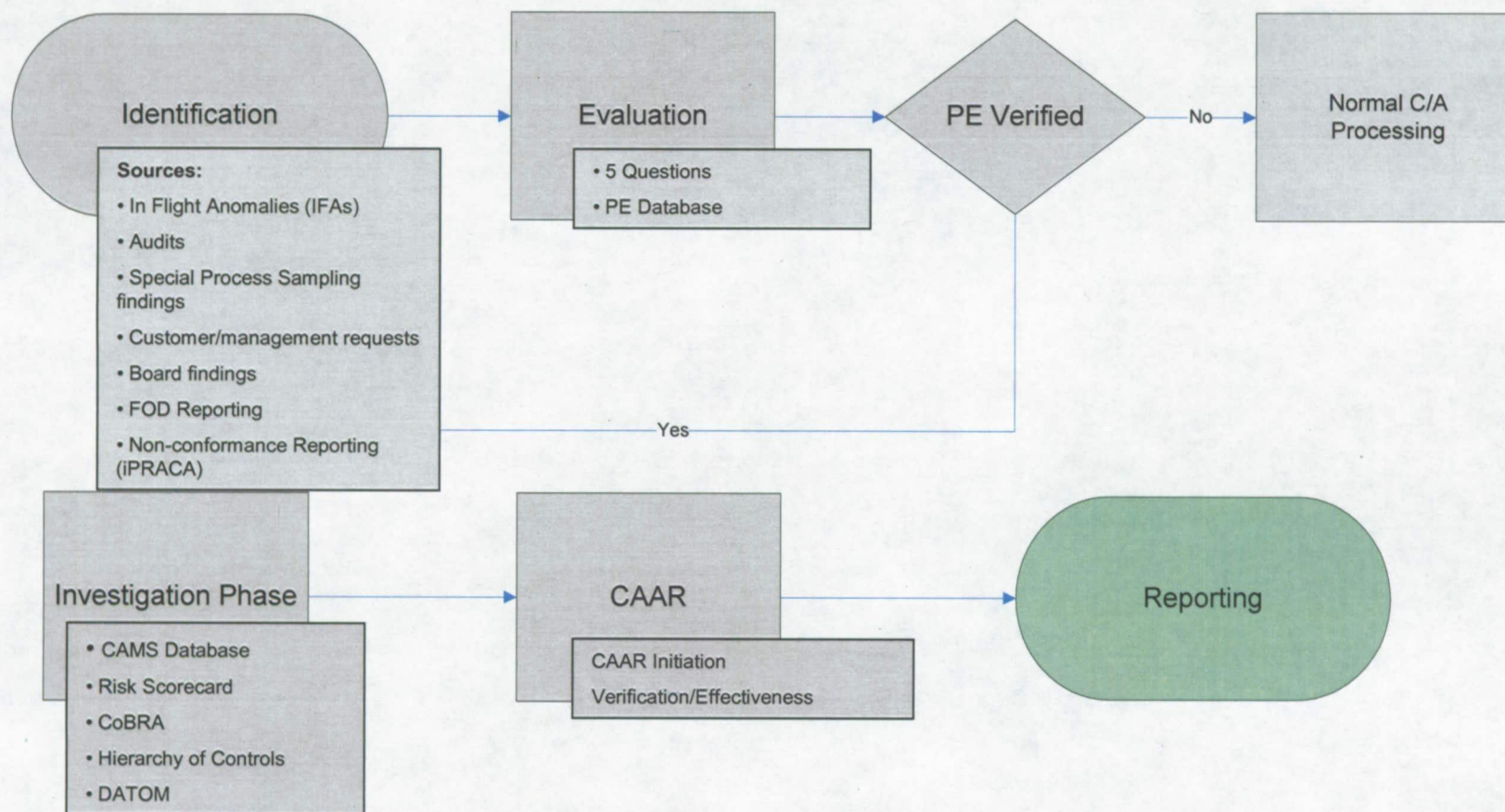


<-> / <+>	02/07	03/07	04/07	05/07	06/07	07/07	08/07	09/07	10/07	11/07	12/07	01/08
Activities	25	20	6	18	21	12	25	34	19	35	12	17
Verified	19	19	6	16	17	10	25	30	19	34	11	16
% Verified	76.0	95.0	100.0	88.9	81.0	83.3	100.0	88.2	100.0	97.1	91.7	94.1



<-> / <+>	03/07	04/07	05/07	06/07	07/07	08/07	09/07	10/07	11/07	12/07	01/08	02/08
Activities	21	8	13	20	13	15	12	15	7	9	13	1
Effective	21	7	9	19	10	14	12	12	7	8	13	1
% Effective	100.0	87.5	69.2	95.0	76.9	93.3	100.0	80.0	100.0	88.9	100.0	100.0

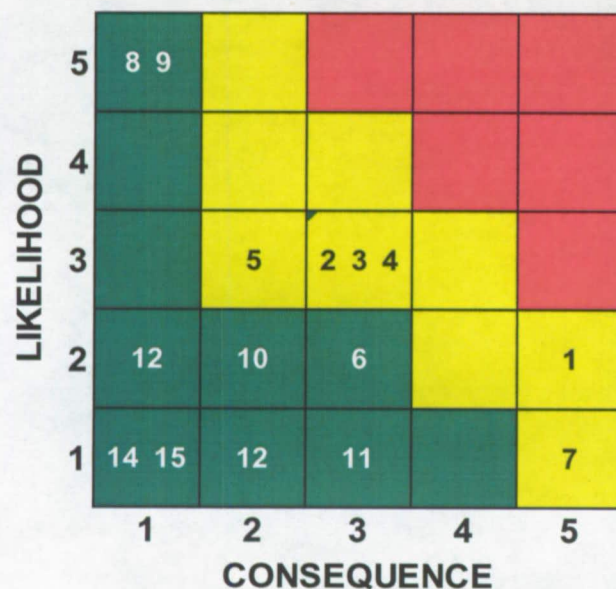
GO Process Escapes: Reporting Phase

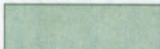


GO Process Escapes: Reporting Phase

Ground Ops Process Escape Risk Matrix

NSTS 07700 Scorecard
(Current Risk Scores)



Closed 

* Reported Previously

Item #	Initial Risk Score	Current				Date Initiated	Date (or Projected) Date Closed	Recurring Escape	Process Escape Title
		Risk Level (R.Y.G)	Risk Score (or Risk Score at closure)	Consequence	Likelihood				
1*	10	Y	10	5	2	Sep-07	TBD	No	H2 Tank 5 Supply Line was Torqued to 525 lbs S/B 240 to 360 lbs (CAMS-10371)
2*	9	Y	9	3	3	May-07	Jan-08	No	Isolation and Hipot Not performed on Body Flap PDU Wire Harness (CAMS-10200)
3*	9	Y	9	3	3	Jan-07	Feb-08	No	Non-flight items found in the Airframe stage post flight (CAMS-10257)
4*	9	Y	9	3	3	Sep-07	Feb-08	No	Violation of OMRSD and Inspection Requirements (CAMS-10385)
5*	6	Y	6	2	3	Mar-06	Feb-08	Yes	Technician working without Cert (CAMS-8679)
6*	6	G	6	3	2	Oct-07	Feb-08	No	QD/Filter Clean Level Violation (CAMS-10419)
7*	5	Y	5	5	1	Nov-07	Jan-08	Yes	STS-120- Post Launch Debris (CAMS-10456)
8*	5	G	5	1	5	Jan-07	Jun-08	No	A86464 Relief Valve Downspout has base guide under MLP Side 1 (CAMS-10248)
9*	5	G	5	1	5	Nov-07	Jan-08	No	Check Valve Missing Installation (CAMS-10467)

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